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Author(s): Kelly, John C.

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Flanged Tritium Waste Containers

Background and Current Path to Disposal



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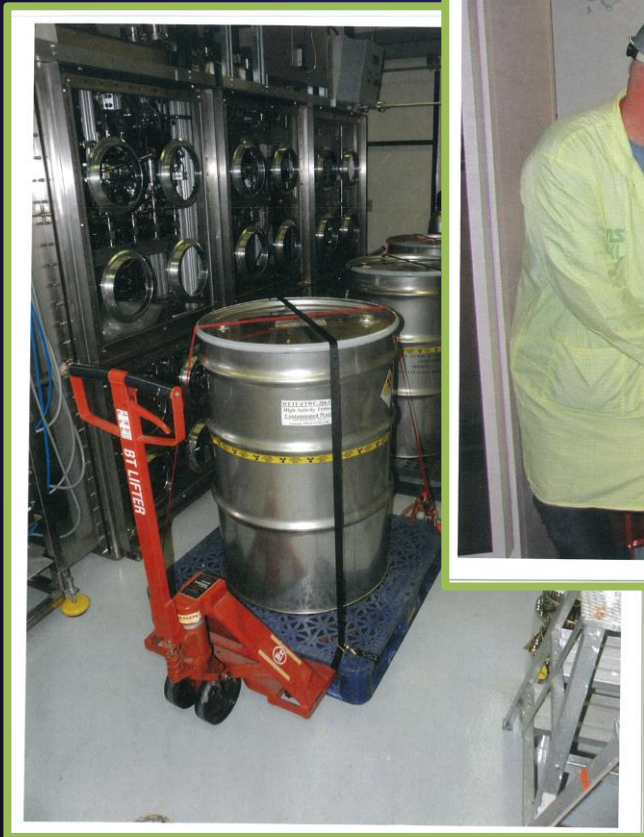
Background

- The MLLW Flanged Tritium Waste Container (FTWC) Project has been operational since 2007 when, during an audit of the FTWC waste stream, it was determined that four FTWC containers contained lead in amounts greater than LDR treatment standards.
- From June to August of 2007, four FTWC containers were shipped to TA-54 for disposal as LLW from WETF. The contents of the FTWCs were characterized as high activity LLW and were thought to be in compliance with LANL's Waste Acceptance Criteria (WAC).
- During the packaging of these FTWC's, 36 intact squib valves (aka actuators), containing detonated squibs were included with the waste stream. After being transported to TA-54 Area G, it was determined that the explosive used in some of the squibs was Normal Lead Styphnate (NLS). A re-characterization of the entire contents in the FTWC's was performed with the conclusion that the squib valves exhibited the RCRA toxic characteristic for Lead (D008), thus resulting in the contents of the FTWCs being reclassified as a Mixed LLW.

Background (cont.)

- Various disposal options have been evaluated including:
 - (2016) Ship the four MLLW containers as is to an offsite TSDF (using a CoC exception for the 10-160B cask during transportation) for processing and subsequent disposal at a TSDF. However, during the comprehensive characterization phase of the project, it was determined that not only had the H₂ levels in the FTWC containers exceeded 5% but that the oxygen levels within the containers had also exceeded 5% creating a potentially explosive environment.
 - (2017 – Present) Process the MLLW FTWC at WETF, transport the fully compliant post-processed waste offsite to a TSDF utilizing the 10-160B cask (without a CoC exception).
 - (2020) Process the MLLW FTWC at WETF and dispose of the now LANL WAC compliant waste at TA-54 Area G.

FTWC Loading



Physical Content of the MLLW FTWC Containers

- The MLLW FTWCs contain:
 - Tritiated water (HTO) on molecular sieve (MS) in
 - AL-M1 (TWTS waste production),
 - expended TWTS MS dryers,
 - paint cans; and
 - plastic bags.
 - Potential Free Standing Liquids (FSL).
 - Lead Styphnate contaminated squib valves.

Valve Model	Total # in FTWC's	TCLP Results for Lead (D008)
 9Z  cut	4	9.49 ppm
 11Z	3	0 ppm
 15Z	5	0 ppm
 3T Fill Stem	3	0 ppm
 Model F  cut	10	0.008 ppm
 3U Unload	4	0 ppm

Physical Content of the MLLW FTWC Containers



Squib Valves



Squib Valves, Molecular Sieve in Paint Cans and TWT Dryer Beds

Physical Content of the MLLW FTWC Containers



Molecular Sieve
in Paint Cans
and Plastic
Bags



AL-M1s



Current Tritium Curie Content

- Based on the comprehensive inventory and calorimeter analysis performed during the original loading of the FTWC containers, the 2007 curie content of tritium is as follows:
 - FTWC 225: 81,900 Ci June 2007
 - FTWC 226: 83,600 Ci August 2007
 - FTWC 227: 24,100 Ci June 2007
 - FTWC 229: 34,000 Ci August 2007
- Current decay estimates place the total curie content at approximately 112,000 curies.
- A complete inventory of each MLLW FTWC container can be found in the attachments accompanying this presentation.

Current Issues Preventing Disposal

- Several issues exist that must be addressed before disposing of FTWC containers either onsite at LANL (Area G) or offsite:
 - Lead in lead styphnate form (D008 code for lead therefore mixed waste failing both LANL and NNSS WAC).
 - >10% void space (fails LANL and NNSS WAC).
 - Suspected free standing liquid >1% inside vessels in ALM-1s that contain molecular sieve loaded with moisture above the TA-54 WAC limit (fails LANL and NNSS WAC).
 - Hydrogen and O₂ buildup both >5% with internal ignition source (D001 code for flammable hydrogen gas at >30 PSIA therefore mixed waste failing both LANL and NNSS WAC).
 - Improper bolts used to close container lid (failing to meet container closure instructions in addition to the LANL and NNSS WAC).
 - Improper bolts were over-torqued during closure (failing to meet container closure instructions and the LANL and NNSS WAC).

Current Plan to Address Disposal Issues

- WFO is currently pursuing the following processing path for the four MLLW FTWC containers.
 - Vent the FTWC at TA-54 Area G Tritium Sheds (currently in FSA process and EPA permit request for venting. This will remove the initial H₂ and O₂ buildup issues.
 - Transfer the four MLLW FTWC to WETF at TA-22 for full waste processing project. This will eliminate the following disposal issues:
 - Remove and segregate all squid vales. Ship squib vales as MLLW in DOT 7A Type A containers to offsite TSDF.
 - Remove mole sieve and inspect for FSL. Package mole sieve into tritium Type A quantities for packaging into DOT 7A Type A containers and ship to offsite TSDF.
 - Vent all internal sources of H₂ and O₂ (primarily within the ALM-1 vessels). Package vented vessels into newly constructed FTWC containers and seal in accordance with manufacture closure instructions.
 - Dispose of remaining FTWC metal carcasses and associated debris as LLW.